2010 & 2011
ARVO ABSTRACTS

Ganglion Cell Complex

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Program#/Poster#: 195/A491

Abstract Title: Evaluation Of Retinal Nerve Fiber Layer Thickness Measurements For Glaucoma Detection: Gdx Pro vs Oct Spectral-domain (RTVue and Spectralis)

Presentation Start/End Time: Sunday, May 01, 2011, 8:30 AM -10:15 AM

Session Number: 108

Session Title: Retinal Imaging in Glaucoma   /

Location: Hall B/C

Reviewing Code: 229 glaucoma: imaging - GL

Author Block: Fabio Mazzolani1, Eleonora Benatti1, Francesca Bertuzzi1, Giulia Esempio1, Eliana Rulli2, Stefano Miglior1. 1Monza policlinico Eye Clinic, Universita' Milano Bicocca, Milan, Italy; 2Oncology, Istituto Mario Negri, Milan, Italy.

Keywords: 607 nerve fiber layer; 549 imaging/image analysis: clinical; 624 optic disc

Abstract Body:
Purpose: To assess diagnostic ability in glaucoma detection of retinal nerve fiber layer (RNFL) thickness measurements obtained by GDx ECC and Spectral-domain optical coherence tomography (RTVue and Spectralis OCT) and to compare the three instruments. To evaluate the diagnostic ability in glaucoma detection of the Ganglion Cell Complex (GCC) parameter available on RTVue OCT.
Methods: 205 patients (70 Normal, 65 Ocular Hypertensive and 70 Glaucomatous) underwent a complete examination, standard automated perimetry (Humphrey 24/2 Sita Standard), pachimetry and RNFL assessment by means of GDx-Pro, FD OCT (RTVue-Optovue Inc; Spectralis Heidelberg Engineering). Areas under the receiver operating characteristic curves (AUROCs) and sensitivity values at a fixed specificity of 95% with 95% Confidence Intervals (CI) were calculated and compared for RNFL parameters obtained by the instruments. Agreement between RNFL measurements obtained by RTVue and Spectralis was evaluated by means of Bland-Altman plots.
Results: The best RNFL parameters are NFI (AUC 0.99, sensitivity 96%) for GDx, "Average" (AUC 0.98, sensitivity 90%) , Inferior-Temporal (AUC 0.97, sensitivity 89%) and Superior-Temporal (AUC 0.96, sensitivity 87%) for RTVue OCT and "Global Average" (AUC 0.99, sensitivity 94%) for Spectralis OCT, with no significant difference between the three devices (P>0.05) The best GCC parameters are FLV% (AUC 0.98, sensitivity 91%) and GLV% (AUC 0.96, sensitivity 87%). Bland and Altman analysis indicate the presence of fixed biases for all the RNFL measurements (P <0.001) and of proportional biases for all the parameters (P <0.001), except for temporal sector. RNFL layer measurements obtained by RTVue tended to be thicker than those obtained by Spectralis.
Conclusions: GDx ECC and both OCT show a good diagnostic ability in glaucoma detection and have comparable diagnostic performance. Elevated values of AUC and high sensitivity values for most RNFL parameters. GCC thickness measurements show excellent diagnostic validity and may be a very useful parameter in early detection of RNFL damage. RNFL thickness measurements obtained by different OCT were not entirely comparable and they should not be used interchangeably.

Program#/Poster#: 5071/A560

Abstract Title: Structure-function Relationship And Diagnostic Value Of Macular Measurement Using Rtvue-100 Oct In Glaucoma

Presentation Start/End Time: Wednesday, May 04, 2011, 3:45 PM - 5:30 PM

Session Number: 479

Session Title: Structure Function Associations in Glaucoma   /

Location: Hall B/C

Reviewing Code: 235 glaucoma: structure/function relationships - GL

Author Block: Yoshiaki Kiuchi1, Paramastri Arintawati1, Takashi Sone1, Junko Tanaka2. 1Ophthalmology & Visual Science, Hiroshima University, Minami-Ku, Japan; 2Department of Epidemiology, Infectious Disease Control and Prevention,, Graduate School of Biomedical Science, Hiroshima University, Hiroshima, Japan.

Keywords: 549 imaging/image analysis: clinical; 530 ganglion cells; 754 visual fields

Abstract Body:
Purpose: To assess the relationship between visual field and macular ganglion cell complex (GCC) thickness measured by RTVue-100 Optical Coherence Tomography (OCT) and to evaluate the diagnostic value of GCC thickness for detecting preperimetric, early, moderate and severe glaucoma.
Methods: Participant underwent reliable standard automated perimetry testing and OCT imaging with GCC scan. The relationship between structure and function was evaluated by comparing GCC average, focal loss volume (FLV) and global loss volume (GLV) with mean deviation (MD); GCC superior and with total deviation (TD) inferior; and GCC inferior with TD superior by regression analysis. The area under the receiver operating characteristic curve (AUC) was used to determine the relationship between disease severity and glaucomatous changes in GCC parameters.
Results: One hundred and eighty nine glaucoma patients and 73 normal subjects were included in this study. Using second-order polynomial model, the relationship between GCC average and MD; GLV and MD; and GCC superior and TD inferior were significant with $p<0.001$, $p=0.0004$, $p=0.029$ respectively. For relationship between FLV and MD; and GCC inferior and TD superior were significant using third-order polynomial model, with $p=0.029$ and $p=0.043$ respectively. A GCC pattern parameter, FLV, had the highest AUC for detecting each stage of glaucoma, with AUC 0.672; 0.775; 0.887; 0.973 in preperimetric, early, moderate and severe glaucoma, respectively. There were significant difference between AUC for FLV and GCC, and FLV and GLV in moderate and severe glaucoma with $p=0.016$, $p=004$; $p=0.036$, $p=0.02$, respectively.
Conclusions: Using second and third-order polynomial model, there were significant relationship between visual field and GCC thickness in glaucoma. The FLV had the highest AUC for detecting each stage of glaucoma. The AUC was higher with the severity of glaucoma stage.

CommercialRelationships: Yoshiaki Kiuchi, None; Paramastri Arintawati, None; Takashi Sone, None; Junko Tanaka, None

Support: None

Program#/Poster#: 5074/A563

Abstract Title: Correlation Between Visual Function Index and Structural Parameters Provided by Spectral-Domain Optical Coherence Tomography in Glaucomatous Eyes

Presentation Start/End Time: Wednesday, May 04, 2011, 3:45 PM - 5:30 PM

Session Number: 479

Session Title: Structure Function Associations in Glaucoma   /

Location: Hall B/C

Reviewing Code: 235 glaucoma: structure/function relationships - GL

Author Block: Pilar d. Moreno1,2, Marina C. Silva1, Luis G. Bitelli1,2, Gabriela C. Barreto2, Tiago S. Prata1,2. 1Ophthalmology Departament, Federal University of Sao Paulo, São Paulo, Brazil; 2Hospital Medicina dos Olhos, Osasco, Brazil.

Keywords: 754 visual fields; 551 imaging methods (CT, FA, ICG, MRI, OCT, RTA, SLO, ultrasound); 530 ganglion cells

Abstract Body:
Purpose: To compare structure-function correlations of macular ganglion cell complex (GCC) and peripapillary retinal nerve fiber layer (pRNFL) analyses as determined spectral-domain optical coherence tomography (SD-OCT).
Methods: We prospectively enrolled glaucomatous patients [glaucomatous optic neuropathy and reproducible visual field (VF)] with previous experience in VF testing (≥ 3 exams) from May 2010 to September 2010. Those with any ocular disease other than glaucoma were excluded. All patients underwent achromatic standard automated perimetry and SD-OCT imaging (RTVue-100; Optovue Inc., CA) using the conventional pRNFL scan (3.45 mm circular scan) and the ganglion cell complex scan (a 7x7mm macular grid, consisting of RNFL, ganglion cell layer and inner plexiform layer). Structure-function relationships were investigated by correlating average GCC thickness and pRNFL thickness with VF mean deviation (MD) and visual field index (VFI).
Results: A total of 52 eyes (52 patients; mean age, 57.6±13.4 years) were included. Mean (±SD) values for MD, VFI, PSD, average GCC thickness and average pRNFL thickness were -5.4dB, 87.3%, 4.2dB, 84.9μm and 92.3μm, respectively. A higher coefficient of determination was found between average GCC thickness and VFI (R^2=0.44, p<0.0001) when compared to average pRNFL thickness and VFI (R^2= 0.34, p<0.0001). Similar results were found when these analyses were performed using MD index values instead of VFI values (GCC vs MD, R^2=0.44, p<0.0001; pRNFL vs MD, R^2=0.34, p<0.0001).It was found that a decrease of 1.1μm in average GCC thickness corresponded to a 1% VFI reduction, while a decrease of 0.7 μm in the average pRNFL thickness resulted in the same VF sensitivity loss.
Conclusions: Both SD-OCT parameters correlated significantly with visual function indexes. A similar or even stronger correlation was found when the GCC analysis, a relative new SD-OCT parameter based on segmented macular evaluation, was considered. Differently from previous studies evaluating total macular thickness, our results highlight the importance of macular assessment in glaucomatous eyes.

CommercialRelationships: Pilar D. Moreno, None; Marina C. Silva, None; Luis G. Bitelli, None; Gabriela C. Barreto, None; Tiago S. Prata, None

Support: None

Program#/Poster#: 164/A460

Abstract Title: Vision-determining Structure In Open Angle Glaucoma Patient Using Spectral Domain Optical Coherence Tomography

Presentation Start/End Time: Sunday, May 01, 2011, 8:30 AM -10:15 AM

Session Number: 108

Session Title: Retinal Imaging in Glaucoma   /

Location: Hall B/C

Reviewing Code: 235 glaucoma: structure/function relationships - GL

Author Block: Ji Hyun Kim1, SeungSoo Rho2, Na Rae Kim2, Sa Min Hong2, Eun Suk Lee2, Gong Je Seong2, Chan Yun Kim2. 1Ophthalmology, Siloam eye hospital, Seoul, Republic of Korea; 2Ophthalmology, Yonsei University College of medicine,, Seoul, Republic of Korea.

Keywords: 750 visual acuity; 549 imaging/image analysis: clinical; 530 ganglion cells

Abstract Body:
Purpose: To determine the structure most significantly correlated with visual acuity in open-angle glaucoma (OAG) using Spectral Domain Optical Coherence Tomography (SD-OCT).
Methods: One hundred seventy-eight eyes of 178 patients with OAG were consecutively enrolled from January 2010 to June 2010. Participants underwent RTVue OCT (ONH scan and GCC scan, Optovue Inc, Fremont, CA), and the best corrected visual acuity (BCVA) was obtained during the same visit. The relationship between BCVA and OCT parameters was evaluated using Spearman's correlation test and regression analysis. Multivariate regression analysis was performed using the BCVA value as a dependent variable. After defining eyes with a BCVA <0.7 as the group having decreased BCVA, a logistic regression analysis was performed with the areas under the receiver operating characteristic (AUROC) curve for variable OCT parameters.
Results: Although the correlation between BCVA and RNFL parameters was limited in the early to moderate glaucoma group, most RNFL parameters were significantly correlated with BCVA in the severe glaucoma group. Of all RNFL parameters, the coefficient of correlation was the highest for the lower temporal (TL) sector, followed by upper temporal (TU) sector, corresponding to the papillomacular bundle area in the severe glaucoma group. Multivariate analysis revealed that papillomacular bundle RNFL thickness and cup to disc area ratio was significantly associated with visual acuity. Logistic regression analysis showed that AUROC of the average RNFL was 0.931 (95% CI: 0.887-0.975), and that of average GCC was 0.875 (95% CI: 0.779-0.972).
Conclusions: Multiple SD-OCT parameters were significantly correlated with visual acuity in glaucoma patients, and such correlations were stronger in patients with more advanced disease. Analysis of the different regions of RNFL thickness showed that RNFL thickness corresponding to the papillomacular bundle area had the highest correlation to the visual acuity.

CommercialRelationships: Ji Hyun Kim, None; SeungSoo Rho, None; Na Rae Kim, None; Sa Min Hong, None; Eun Suk Lee, None; Gong Je Seong, None; Chan Yun Kim, None

Support: None

Program#/Poster#: 192/A488

Abstract Title: Analysis of Macular and Peripapillary Areas in Myopic Glaucomatous Eyes Using FD-OCT

Presentation Start/End Time: Sunday, May 01, 2011, 8:30 AM -10:15 AM

Session Number: 108

Session Title: Retinal Imaging in Glaucoma   /

Location: Hall B/C

Reviewing Code: 229 glaucoma: imaging - GL

Author Block: Teresa Rolle, Cristina Briamonte, Beatrice Brogliatti, Federico M. Grignolo. Clin Physiopathol-Section of Opht, University of Torino, Torino, Italy.

Keywords: 530 ganglion cells; 551 imaging methods (CT, FA, ICG, MRI, OCT, RTA, SLO, ultrasound); 626 optic nerve

Abstract Body:
Purpose: To investigate the effect of myopia on Peripapillary Nerve Fiber Layer (RNFL) and Ganglion Cell Complex (GCC) values as measured by ONH and GCC scans of FD-OCT RTVue 100 in early glaucomatous eyes.
Methods: 88 eyes (88 patients) with Early Glaucoma (according to Hodapp classification) and 52 Normal eyes (52 subjects,age and sex matched) were included in the study. According to spherical equivalent (SE), each group has been subdivided into Non Myopic and Myopic subgroups (mean SE: -3.50 D in both groups, range: -2 to -9D). The more myopic eye was chosen as study eye. RNFL and GCC scans were obtained using RTVue 100. Correlation coefficients were calculated for demographic characteristics, macular and RNFL parameters, degree of myopia. The potential effect of age on the results was avoided applying a linear correction factor. Significance was set at $p<0.05$.
Results: In Normal Group, the linear regression analysis shows a statistically significant thinning for both RNFL and GCC parameters as SE decreases, especially for GCCAvg (R:-0.39;p=0.004), GCCsup (R:-043;p=0.001) and GLV (R: 0.36;p=0.007). The comparison of correlations levels (non myopic vs myopic eyes) was significantly different for most of the parameters. In Early Glaucoma group the linear regression analysis shows significant correlations between macular and RNFL values with SE only for RNFLsup(R-0.27;p=0.01). The comparison of correlations levels (non myopic vs myopic eyes) was significantly different only for RNFLsup (p=0.02). No significant correlation was found with age nor in Normal neither in Early Glaucoma group.
Conclusions: GCC and RNFL parameters in glaucomatous eyes vary with SE and age, but without statistical significance. Therefore Macular and Peripapillary measurements using FD-OCT RTVue 100 are useful parameters to assess and monitor glaucomatous damage in myopic eyes.

CommercialRelationships: Teresa Rolle, None; Cristina Briamonte, None; Beatrice Brogliatti, None; Federico M. Grignolo, None

Support: None

Program#/Poster#: 5072/A561

Abstract Title: Correlation of Frequency-Doubling Technology with Circumpapillary Retinal Nerve Fiber Layer, Ganglion Cell Complex, and Optic Nerve Head in Preperimetric Glaucoma

Presentation Start/End Time: Wednesday, May 04, 2011, 3:45 PM - 5:30 PM

Session Number: 479

Session Title: Structure Function Associations in Glaucoma   /

Location: Hall B/C

Reviewing Code: 235 glaucoma: structure/function relationships - GL

Author Block: Takafumi Hirashima, Masanori Hangai, Masayuki Nukada, Satoshi Mori, Noriko Nakano, Tadamichi Akagi, Atsushi Nonaka, Nagahisa Yoshimura. Ophthalmology and Visual Sciences, Kyoto University, Kyoto, Japan.

Keywords: 754 visual fields; 626 optic nerve; 530 ganglion cells

Abstract Body:
Purpose: To determine the structure-function correlation in preperimetric glaucoma(PPG) using frequency-doubling technology (FDT), speckle-noise-reduced spectral domain optical coherence tomography (enhanced SD-OCT), single-scan SD-OCT (RTVue-100), and Heidelberg Retinal Tomograph II (HRT II).
Methods: This study included 26 eyes of 23 patients with PPG and 20 eyes of 15 normal subjects. All subjects underwent standard automated perimetry 24-2, FDT 24-2, enhanced SD-OCT(Spectralis HRA+OCT), RTVue-100, and HRT II. Circumpapillary retinal nerve fiber layer (cpRNFL) thickness was measured on enhanced SD-OCT. Ganglion cell complex (GCC) thickness was measured on RTVue-100. Optic nerve head (ONH) topographical parameters [rim area/rim volume] were measured on HRT II. Pearson correlation coefficient was calculated among the measurements. The ability to discriminate PPG from normal eyes was assessed by the area under the receiver operating characteristic curves (AUROC).
Results: In eyes with PPG, FDT-mean deviation(MD) significantly correlated only with rim area ($r = 450$, $P = 0.021$), but not with cpRNFL and GCC thickness ($P = 0.162$, and $P = 0.548$, respectively). The cpRNFL thickness significantly correlated with rim area and GCC thickness ($r = 466$, $P = 0.017$, and $r = 791$, $P < 0.01$, respectively). There was no significant correlation between rim area and GCC thickness($P = 0.118$). The AUROC for FDT-MD, cpRNFL, GCC, and rim area were 0.762, 0.884, 0.815, and 0.599, respectively. The Venn diagram of abnormalities in each structure showed that the addition of cpRNFL or GCC to FDT increased the diagnostic power(sensitivity + specificity) from 1.59(0.69 + 0.90) to 1.74(0.84 + 0.90) and 1.76(0.96 + 0.80), while the addition of HRT II decreased from 1.59(0.69 + 0.90) to 1.30(0.80 + 0.50).
Conclusions: FDT-MD did not correlate with structural parameters except for rim area in PPG. The combination of FDT and cpRNFL or GCC resulted in improved diagnostic power for PPG detection.

CommercialRelationships: Takafumi Hirashima, None; Masanori Hangai, None; Masayuki Nukada, None; Satoshi Mori, None; Noriko Nakano, None; Tadamichi Akagi, None; Atsushi Nonaka, None; Nagahisa Yoshimura, None

Support: None

Program#/Poster#: 194/A490

Abstract Title: Glaucoma Detection Capability of Optic Disc, Peripapillary Retinal Nerve Fiber Layer, and Macular Thickness with RTVue Spectral-Domain Optical Coherence Tomography in Preperimetric Glaucoma

Presentation Start/End Time: Sunday, May 01, 2011, 8:30 AM -10:15 AM

Session Number: 108

Session Title: Retinal Imaging in Glaucoma   /

Location: Hall B/C

Reviewing Code: 229 glaucoma: imaging - GL

Author Block: Jung Hwa Na, Youngrok Lee, Kyung Rim Sung, Michael S. Kook. Department of Ophthalmology, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Republic of Korea.

Keywords: 549 imaging/image analysis: clinical

Abstract Body:
Purpose: To evaluate the capability of the optic nerve, peripapillary retinal nerve fiber layer (p-RNFL), and macular (GCC) parameters in discriminating healthy eyes from those with preperimetric glaucoma using spectral domain optical coherence tomography (SD-OCT, RTVue 100, software version 5.0; Optovue, Inc.).
Methods: Ninety three eyes from 93 subjects (42 eyes with preperimetric glaucoma and 51 age and refractive error-matched healthy eyes) were recruited prospectively, in a consecutive manner from July 2010 to October 2010. The red-free photography was evaluated by two glaucoma specialists, and only those eyes that had RNFL defect (localized and/or diffuse) agreed by both specialists were enrolled as glaucomatous eyes. Areas under the receiver operating curves (AUCs) and sensitivities at fixed specificities (80%, 90%, and 95%) were calculated and compared among various site-specific parameters.
Results: Average RNFL thickness for the p-RNFL parameters showed the best diagnostic capability (AUC 0.848, p<0.0001). However, there was no statistically significant difference between Average RNFL thickness and Superior GCC thickness for macular parameters (AUC: 0.848 vs. 0.812, p=0.6063). Horizontal C/D ratio showed the largest AUC (AUC 0.787, p= 0.0008) among optic disc parameters. Average RNFL thickness showed the highest sensitivities among all parameters at specified specificities (67%, 58%, and 58%, respectively).
Conclusions: Macular thickness parameters (Average, Superior, and Inferior GCC) had similar detection capabilities compared to p-RNFL parameters. Based on RTVue OCT, optic disc parameters were not as sensitive as p-RNFL or GCC parameters in differentiating preperimetric glaucoma from healthy eyes. Macular parameters may be a good adjunctive to p-RNFL thickness in the assessment of preperimetric glaucoma.

CommercialRelationships: Jung Hwa Na, None; Youngrok Lee, None; Kyung Rim Sung, None; Michael S. Kook, None

Support: None

Abstract Title: Retinal Nerve Fibre Layer And Ganglion Cells Layer Thickness Evaluation In Alzheimer Disease: Follow-Up Study

Presentation Start/End Time: Tuesday, May 03, 2011, 3:45 PM - 5:30 PM

Session Number: 374

Session Title: Imaging of the Healthy and Diseased Retina II

Location: Hall B/C

Reviewing Code: 244 imaging of the retina in health and disease - MOI

Author Block: Ermengarda Marziani1, Simone Pomati2, Paola Ramolfo1, Mario Cigada1, Andrea Giani3, Claudio Mariani2, Giovanni Staurenghi1. 1Eye Clinic, Department of Clinical Science Luigi Sacco, Sacco Hospital, University of Milan, Milan, Italy; 2Neurology Clinic, Centre for Research and Treatment on Cognitive Dysfunctions, Sacco Hospital, University of Milan, Milan, Italy; 3Retina Service, Department of Ophthalmology, Massachusetts Eye and Ear Infirmary, Harvard Medical School, Boston, MA.

Keywords: 607 nerve fiber layer; 530 ganglion cells; 685 retina

Abstract Body:
Purpose: To follow-up differences in variation of Retinal Nerve Fibre Layer (RNFL) thickness and RFNL+ Ganglion Cells Layer (GCL) between patients affected by Alzheimer Disease (AD) and age-matched healthy patients
Methods: Exclusion criterion was the presence of any possible cause of RNFL and GCL alteration. Patients and controls underwent neurological examination, clock drawing test (CDT), Mini Mental State Examination (MMSE) and comprehensive ophthalmic evaluation at six months and one year follow-up. Spectral-Domain Optical Coherence Tomography (SD-OCT) examination was performed using Spectralis SD-OCT(Heidelberg Engineering,Heidelberg,Germany), and RTVue-100 (Optovue Inc., Freemont, CA, USA). RNFL thickness map was obtained using Spectralis volume protocol with 19 lines on 30° field centred on optic disk. On each B-scan the outer RNFL limit was manually delineated. RFNL+GCL thickness map was obtained using RTVue-100 MM6 protocol. Maps were divided in 9 zones (central, superior internal, temporal internal, inferior internal, nasal internal, superior external, temporal external, inferior external, nasal external) and each map value in every field was evaluated
Results: We analyzed 23 AD patients: (23 eyes) and 29 controls at baseline; 18 AD patients (18 eyes) and 24 controls (24 eyes) at six months; and 14 AD patients (14 eyes) and 21 controls (21 eyes) at one year. A significant difference between RNFL and RNFL+GCL thickness in AD patients and controls was found in all the fields (p between <0.001 and 0.026 for RTVue-100; p between <0.001 and 0.002 for Spectralis) at each of the studied time points. A significant RNFL reduction through the time points was demonstrated in both AD patients and controls when using Spectralis (p between <0.001 and 0.003); no significant reduction of RNFL+GCL through the time points was demonstrated in AD patients and controls (p between 0.2 and 0.87).
Conclusions: RFNL thickness measurements decreased through the time points, while RNFL+GCL thickness remained stable. Further studies are necessary to assess the use of SD-OCTs in the evaluation of disease progression.

CommercialRelationships: Ermengarda Marziani, None; Simone Pomati, None; Paola Ramolfo, None; Mario Cigada, None; Andrea Giani, None; Claudio Mariani, None; Giovanni Staurenghi, Heidelberg Engineering,Heidelberg,Germany (C), Optovue Inc.,Freemont,CA (R)

Support: None

Program#/Poster#: 3701/D808

Abstract Title: Anatomic And Functional Features Of Ischemic Diabetic Maculopathy

Presentation Start/End Time: Tuesday, May 03, 2011, 3:45 PM - 5:30 PM

Session Number: 374

Session Title: Imaging of the Healthy and Diseased Retina II

Location: Hall B/C

Reviewing Code: 326 optical coherence tomography: new technology - MOI

Author Block: Elisabetta Chiariello Vecchio, Gilda Cennamo, Giuseppe de Crecchio, Giovanni Cennamo. Oftalmologia, Universita Federico II, Napoli, Italy.

Keywords: 530 ganglion cells; 551 imaging methods (CT, FA, ICG, MRI, OCT, RTA, SLO, ultrasound); 584 macula/fovea

Abstract Body:
Purpose: To describe anatomic and functional features of ischemic diabetic maculopathy by high-speed Fourier-domain optical coherence tomography (FD-OCT) and Fundus Microperimetry
Methods: In a prospective study, fortyfive consecutive patients (70 eyes) with ischemic diabetic maculopathy underwent best corrected visual acuity determination, fluorescein angiography, Fundus Microperimetry(MP1, Nidek Inc, Italy) and RTVue FD-OCT. Main outcome measures were fixation stability and position and mean retinal sensitivities within the 4 central degrees areas. Foveal thickness and Ganglion cell complex (GCC) thickness were measured by RTVue FD-OCT.
Results: Fixation was central in 46 eyes (65,71%) and poor in 4 eyes (5,71%), and predominantly eccentric in 10 eyes (14,28%). Stable in 40 (57,14%) and relative unstable in 16 (22,85%) and unstable in 4 eyes (5,71%). Mean central 4 degrees retinal sensitivity- SD was 8.5 ±2.5.; LogMAR BCVA ranged from 0.1 to 1.3. Mean OCT foveal thickness -SD was 120 ±30.83.GCC thickness average was 75.2.
Conclusions: FD-OCT showed a reduction of GCC thickness in all eyes with ischemic diabetic maculopathy. Whereas stability of fixation and foveal thickness play a major role in conditioning BCVA.

CommercialRelationships: Elisabetta Chiariello Vecchio, None; Gilda Cennamo, None; Giuseppe de Crecchio, None; Giovanni Cennamo, None

Support: None

Author Block: *G. Jonnadula[1], S. Senthil[1], U.K. Addepalli[2A], H.L. Rao[1,3], C.S. Garudadri[2B].* [1]Glaucoma, L.V.Prasad Eye Institute, Hyderabad, India; [A]Optometry, [B]Glaucoma, [2]LV Prasad Eye Institute, Hyderabad, India; [3]Hamilton Glaucoma Center, UCSD, La Jolla, CA.

Abstract Body:

Purpose: To compare the diagnostic ability of macular inner retinal and peripapillary retinal nerve fiber layer (RNFL) measurements by RTVue spectral domain optical coherence tomography (SDOCT) in early glaucoma.

Methods: In a cross-sectional, observational study, 64 eyes of 64 normal subjects and 59 eyes of 41 early glaucoma patients underwent macular and RNFL imaging with RTVue. Normal subjects had normal and reliable standard automated perimetry (SAP) results and a normal ocular examination. Glaucomatous eyes had a repeatable abnormal SAP result that satisfied at least two of the Anderson's criteria and the mean deviation was better than or equal to - 6 dB. The areas under the receiver operating characteristic curves (AUCs) and the sensitivities at a fixed specificity of 95%, of the macular and RNFL parameters were compared.

Results: The AUCs for the macular inner retinal parameters ranged from 0.587 for the macular inner retinal superior minus inferior thickness average to 0.896 for the ganglion cell complex - focal loss volume (GCC-FLV). The AUCs for the RNFL parameters ranged from 0.520 for the temporal quadrant thickness to 0.784 for the inferior quadrant RNFL thickness. The AUC of the best macular parameter (GCC-FLV) was significantly greater (p=0.01) than the best RNFL parameter (inferior quadrant thickness, figure). Sensitivity at a fixed specificity of 95% was 57.8% for GCC-FLV and was 18.8% for the inferior quadrant RNFL thickness.

Conclusion: Macular parameters with SDOCT have a better diagnostic accuracy to detect early glaucoma compared to the RNFL parameters.
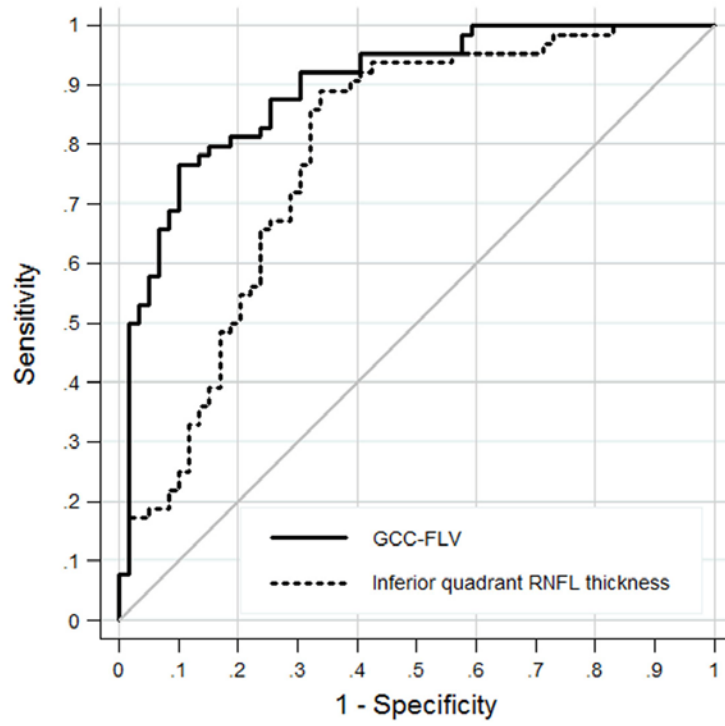
Abstract Title: **Does Ganglion Cell Complex Scan Predict Glaucoma Earlier Than Retinal Fiber Layer Thickness Map in Suspects and Glaucoma Patients Using Fourier Domain OCT?**

Presentation Start/End Time: Sunday, May 02, 2010, 8:30 AM -10:15 AM

Session Number: 110

Session Title: Retinal Imaging in Glaucoma

Location: Hall B/C

Reviewing Code: 231 glaucoma: imaging – GL

Author Block: *F.N. Kanadani[1,2], T.C. Kanadani[3A], E.R. Diniz[3A], V. Rezende[3B], S.K. Dorairaj[4], N.V. Lima[5], T.S. Prata[6].* [1]Ophthalmology/Glaucoma, New York Eye and Ear Infirmary, Belo Horizonte, Brazil;[2]Ophthalmology/Glaucoma, SANTA CASA OF BELO HORIZONTE/UNIFESP, Belo Horizonte, Brazil; [A]Ophthalmology, [B]Ophthalmology/Glaucoma, [3]Santa Casa de Belo Horizonte, Belo Horizonte, Brazil; [4]Glaucoma, Einhorn Rsch Center, NYEE, New York, NY;[5]Ophthalmology/Glaucoma, Hospital Sao Geraldo, Belo Horizonte, Brazil; [6]Ophthalmology, New York Eye & Ear Infirmary, New York, NY.

Keywords: 530 ganglion cells, 551 imaging methods (CT, FA, ICG, MRI, OCT, RTA, SLO, ultrasound), 754 visual fields

Abstract Body: **Purpose:** To compare the ganglion cell complex scan (GCC) with retinal fiber layer thickness map (RNFL) in suspects and glaucoma patients.
Methods: 40 patients [20 glaucoma suspects (GS; normal SAP, C/D ratio > 0.5 or asymmetry > 0.2 and/or ocular hypertension), and 20 glaucoma patients (MD < -12 dB, glaucomatous optic neuropathy)] were prospectively enrolled. GCC and RNFL map protocols [Fourier Domain OCT,RT Vue, Optovue Inc.] were performed in both eyes of each patient in the same visit. Exclusion criteria SAP was performed with the Octopus 3.1.1 Dynamic 24-2 program. The statistical analysis was performed with the SPSS 10.1 (SPSS Inc. Chicago, IL, EUA). Results were expressed as mean ± standard deviation and a p value of 0.05 or less was considered significant.
Results: There was a statistical significant difference in average RNFL thickness (p=0.004), Superior RNFL thickness (p=0.006), Inferior RNFL thickness (p=0.0005) and average GCC (p=0.03) between suspects and glaucoma patients. There was no difference in Optic Disc area (p=0.35) and vertical Cup/Disc ration (0.234) comparing both groups. 15 of 40 (38%) eyes had an abnormal GCC and 5 of 40 eyes (13%) had an abnormal RNFL thickness in the suspect glaucoma group. 39 of 40 eyes (98%) had an abnormal GCC and 36 of 40 eyes had an abnormal RNFL thickness in the glaucoma group.
Conclusions:
Although RNFL thickness has been used for diagnose of glaucoma, the GCC protocol is indicative of earlier structural glaucoma damage. The GCC printout is comparable to the visual field defect in most of glaucoma patients.

Support: None

Program#/Poster#:	4906/A329
Abstract Title:	**Correlation of Visual Field Damage With Structural Changes in Macular Ganglion Cell Complex, Parapapillary Retinal Nerve Fiber Layer and Optic Disc Morphology in Open-Angle Glaucoma Eyes**
Presentation Start/End Time:	Wednesday, May 05, 2010, 3:45 PM - 5:30 PM
Session Number:	476
Session Title:	Structure Function Associations in Glaucoma 6 3 8
Location:	Hall B/C
Reviewing Code:	237 glaucoma: structure/function relationships - GL

Author Block:	*S. Konno, A. Tomidokoro, M. Araie.* Department of Ophthalmology, University of Tokyo Graduate School of Medicine, Bunkyo-ku,Tokyo, Japan.

Keywords:	607 nerve fiber layer, 530 ganglion cells, 549 imaging/image analysis: clinical

Abstract Body:

Purpose:
To evaluate correlations of macular ganglion cell complex (mGCC) thickness, parapapillary retinal nerve layer (pRNFL) thickness and optic disc topography with visual field defects in glaucoma patients.

Methods:
Patients: Sixty five eyes of 65 patients with open-angle glaucoma, whose mean deviation (MD) of the Humphrey Field Analyzer (HFA) 24-2 ranged from -20.6 to -0.2 (mean -8.0) dB.
Observation Procedures: Imaging of mGCC, pRNFL and optic disc topography using a spectral-domain optical coherence tomography (SD-OCT, RTVue-100, Optovue Inc. Fremont, CA).
Main Outcome Measures: Structural parameters including mGCC thickness, pRNFL thickness, and parameters of optic disc topography, and visual field parameters including MD and global and sectorized averages of sensitivity threshold of HFA.
Statistical analysis: Correlations between VFD and the structural parameters including mGCC thickness, pRNFL thickness, and optic disc topography were assessed with Pearson's correlation coefficient and analysis of covariance to adjust for disc area.

Results:
Significant correlations were found between mGCC thickness and pRNFL thickness (Pearson's correlation coefficient [R] = 0.77, $P<0.001$), between mGCC thickness and rim area (R=0.64, $P<0.001$), and between pRNFL thickness and rim area (R=0.71, $P<0.001$). MD was significantly correlated with mGCC thickness and pRNFL thickness with similar strength (R=0.56, $P<0.001$, each). Among optic disc parameters, rim area was most strongly correlated with MD (R=0.46, $P<0.001$), but the correlation was relatively weaker compared to mGCC and pRNFL. Superior average of mGCC thickness was most strongly correlated with the inferior average of sensitivity (R=0.71, $P<0.001$).

Conclusions: In open-angle glaucoma eyes, mGCC thickness was highly correlated with pRNFL thickness and gave significant correlation with visual field defects which was comparable to pRNFL thickness and better than optic disc parameters, suggesting that mGCC measurement might be a good alternative to pRNFL measurement in the observation of glaucoma progression.

CommercialRelationships:	**S. Konno**, None; **A. Tomidokoro**, None; **M. Araie**, None.
Support:	None

Program#/Poster#:	4894/A317
Abstract Title:	**Correlations of Retinal Nerve Fiber Layer, Optic Disc and Ganglion Cell Complex Parameters of Fourier-Domain Optical Coherence Tomography with Visual Field Loss in Japanese Glaucoma Patients**
Presentation Start/End Time:	Wednesday, May 05, 2010, 3:45 PM - 5:30 PM
Session Number:	476
Session Title:	Structure Function Associations in Glaucoma 🟡❸🟢
Location:	Hall B/C
Reviewing Code:	237 glaucoma: structure/function relationships - GL

Author Block:	*M. Shirakashi[1], K. Yaoeda[1,2], H. Abe[1].* [1]Division of Ophthalmology and Visual Sciences, Niigata University Graduate School of Medical and Dental Sciences, Niigata, Japan; [2]Yaoeda Eye Clinic, Nagaoka, Japan.

Keywords:	549 imaging/image analysis: clinical, 607 nerve fiber layer, 624 optic disc

Abstract Body:

Purpose: To evaluate and compare the degree to which the retinal nerve fiber layer (RNFL), optic disc and ganglion cell complex (GCC) parameters of RTvue Fourier-domain optical coherence tomography (Optovue Inc, Fremont, CA) correlate with visual field loss in Japanese glaucoma patients.

Methods: Using RTvue (software version 4.0), RNFL (average RNFL thickness), disc (cup area, cup/disc area ratio, rim area, rim volume, nerve head volume, and cup volume), and GCC (average GCC thickness) parameters were measured in 110 eyes of 110 Japanese glaucoma patients. Correlation coefficients (CCs) of the RNFL, disc and GCC parameters, with mean deviation (MD) (Humphrey Swedish interactive threshold algorithm standard 30-2 program), were calculated and compared.

Results: MD, average RNFL thickness, cup area, cup/disc area ratio, rim area, rim volume, nerve head volume, cup volume and average GCC thickness averaged -6.41 (standard deviation 7.42) dB, 85.61 (14.59) μm, 1.27 (0.66) mm^2, 0.65 (0.26), 0.59 (0.38) mm^2, 0.072 (0.101) mm^3, 0.126 (0.151) mm^3, 0.409 (0.334) mm^3 and 80.63 (11.23) μm, respectively. The CCs of the average RNFL thickness, cup area, cup/disc area ratio, rim area, rim volume, nerve head volume, cup volume, and average GCC thickness, with MD, were 0.591 (P<0.001), -0.083 (P=0.387), -0.198 (P=0.038), 0.264 (P=0.005), 0.089 (P=0.358), 0.117 (P=0.223), 0.116 (P=0.226) and 0.615 (P<0.001), respectively. The CCs for both the average RNFL thickness and the average GCC thickness were significantly higher than that for the rim area, which showed the highest CC among the disc parameters determined (P<0.001). The CC for average RNFL thickness did not differ significantly from that for average GCC thickness (P=0.583).

Conclusions: Average RNFL thickness, rim area and average GCC thickness, as determined by RTvue, correlated significantly with visual field loss in Japanese glaucoma patients. Average RNFL and GCC thicknesses showed a similar degree of correlation, with these parameters providing stronger correlations than the rim area.

CommercialRelationships:	**M. Shirakashi**, None; **K. Yaoeda**, None; **H. Abe**, None.
Support:	None

Program#/Poster#:	4890/A313
Abstract Title:	Correspondence Between Fourier-Domain Optical Coherence Topography Measurements of Macular Ganglion Cell Complex Thinning to Visual Field Deficits
Presentation Start/End Time:	Wednesday, May 05, 2010, 3:45 PM - 5:30 PM
Session Number:	476
Session Title:	Structure Function Associations in Glaucoma
Location:	Hall B/C
Reviewing Code:	231 glaucoma: imaging – GL

Author Block: *P.V. Le[1], O. Tan[1], R. Varma[1], O. Ragab[2], D. Huang[1], Advanced Imaging for Glaucoma Study (AIGS).* [1]Doheny Eye Institute and Department of Ophthalmology, University of Southern California, Los Angeles, CA; [2]USC Keck School of Medicine, Los Angeles, CA.

Keywords: 551 imaging methods (CT, FA, ICG, MRI, OCT, RTA, SLO, ultrasound), 754 visual fields, 549 imaging/image analysis: clinical

Abstract Body: **Purpose:** To determine whether macular Ganglion Cell Complex (GCC) thinning corresponds to central visual field deficits.
**Participants:** Fifty-five eyes from 37 patients in the Advanced Imaging for Glaucoma Study (www.AIGStudy.net) with perimetric glaucoma.
Methods: A Fourier-domain optical coherence tomography (FD-OCT) system (RTVue by Optovue, Fremont, CA) was used to map the macula over a 7x6mm region. The images were exported using RTVue software v3.0 and then processed using software described earlier. The mean GCC thicknesses of the superior and inferior halves of each macula were calculated. Since the 7x6mm scan region corresponds to approximately 24x20 degrees, the central 5x4 point grid of the Humphrey SITA 24-2 Standard Visual Field (VF) was utilized for the visual field analysis. The mean deviation was calculated for each half (superior/inferior) of the central grid. Pearson's correlation coefficient was calculated for pairwise comparisons between VF and GCC thickness. All eyes were considered independently. Measurements from 125 normal eyes were used to normalize the GCC thickness in the figure.
Results: Correlation analysis showed significant positive correlations between anatomically-related VF and GCC hemispheres (Superior VF to inferior GCC, $r=0.562$, $p<0.0001$; inferior VF to superior GCC, $r=0.481$, $p<0.0003$). The anatomically-unrelated hemispheres had no significant correlation (Superior VF to superior GCC $r=-0.0249$, $p=0.857$; inferior VF to inferior GCC, $r=-0.0192$, $p=0.890$).
Conclusions: There is good correspondence between the locations of macular GCC thinning and visual field deficits in patients with perimetric glaucoma.

**Visual Field and Normalized Ganglion Cell Complex Thickness (%)
Patient 4029**
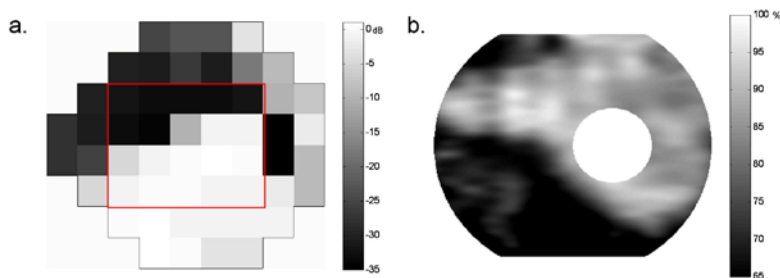
a. Visual Field, deviation in dB, right eye. There is a superior arcuate defect with some involvement of fixation. The central 5x4 grid used in the comparison is outlined.
b. Normalized Ganglion Cell Complex (GCC) thickness (%), right eye. The white circle is the fovea, which is excluded because the GCC is too thin to measure reliably. There is a large area of thinning infero-temporal to the fovea, corresponding to the superior VF defect.

Program#/Poster#:	247/A515
Abstract Title:	**Evaluation of Retinal Nerve Fiber Layer Thickness Measurements for Glaucoma Detection: Time Domain vs Spectral Domain Optical Coherence Tomography**
Presentation Start/End Time:	Sunday, May 02, 2010, 8:30 AM -10:15 AM
Session Number:	110
Session Title:	Retinal Imaging in Glaucoma. 🄱
Location:	Hall B/C
Reviewing Code:	231 glaucoma: imaging – GL

Author Block: *E. Benatti[1], F. Verga[1], S. Bochicchio[1], F. Bertuzzi[1], G. Esempio[1], E. Rulli[2], S. Miglior[1].* [1]Ophthalmology, Policlinico di Monza, University Milano-Bicocca, Monza (MI), Italy; [2]Biostatistics, Istituto Mario Negri, Milano, Italy.

Keywords: 549 imaging/image analysis: clinical, 624 optic disc, 607 nerve fiber layer

Abstract Body: **Purpose:** To compare diagnostic ability in glaucoma detection between retinal nerve fiber layer (RNFL) thickness measurements obtained by spectral domain optical coherence tomography (OCT) and time domain OCT. **Patients and Methods:** 105 eyes of 105 patients (36 Normal, 33 Ocular Hypertensive and 36 Glaucomatous) underwent a complete examination, standard automated perimetry, TD-OCT (Stratus OCT;Carl Zeiss Meditec) and FD-OCT (RTVue;Optovue Inc.). Areas under the receiver operating characteristic curves (AUROCs) and sensitivity values at a fixed specificity of 95% were calculated and compared for RNFL parameters obtained by both instruments. We also evaluated the diagnostic ability in glaucoma detection of the "ganglion cell complex " parameter (GCC) available on SD-OCT. Agreement between RNFL measurements was evaluated by means of Bland-Altman plots. **Results:** The average (AUC, 0.94 SD-OCT and 0.92 Stratus OCT), superior (AUC, 0.90 and 0.90, respectively), and inferior (AUC, 0.92 and 0.87, respectively) RNFL thicknesses showed the best AUROCs with no significant difference between the two OCT devices ($P>0.05$). FD-OCT showed higher sensitivity at 95% specificity (64% to 81%) than TD-OCT (61% to 69%). The FD-OCT parameter GCC thickness showed AUROCs 0.93 to 0.95 and sensitivities at 95% specificity 75% to 81%. Average, Superior, Inferior, Nasal and Temporal RNFL thicknesses measurements were significantly higher in FD-OCT than in TD-OCT measurements in the Bland-Altman plots ($P<0.001$). **Conclusions:** While FD-OCT and TD-OCT have comparable diagnostic performance in glaucoma detection, Fourier domain technology seems to be a better diagnostic tool in a clinical setting, because it is user-friendly, repeatable and in most of patients examination does not require pupil dilatation. GCC thickness measurements show excellent diagnostic validity and may be a promising parameter in the clinical assessment of glaucoma. RNFL thickness measurements obtained from the two OCT technologies may not be used interchangeably.

CommercialRelationships: **E. Benatti**, None; **F. Verga**, None; **S. Bochicchio**, None; **F. Bertuzzi**, None; **G. Esempio**, None; **E. Rulli**, None; **S. Miglior**, Zeiss, Heidelberg, Optovue, C.

Support: None

Program#/Poster#:	237/A505
Abstract Title:	**Comparing the Ganglion Cell Complex and Retinal Nerve Fiber Layer Measurements by Fourier Domain Optical Coherence Tomography to Detect Glaucoma in High Myopia**
Presentation Start/End Time:	Sunday, May 02, 2010, 8:30 AM -10:15 AM
Session Number:	110
Session Title:	Retinal Imaging in Glaucoma🟡🔵
Location:	Hall B/C
Reviewing Code:	231 glaucoma: imaging – GL

Author Block:	*J. Kim[1], N. Kim[1], E. Lee[1], S. Kim[1], S. Byeon[1], G. Seong[1], S. Kang[2], S. Hong[1], C. Kim[1].*[1]Ophthalmology, Yonsei University, Seoul, Republic of Korea; [2]Ophthalmology, Asan Medical Center, Seoul, Republic of Korea.

Keywords:	551 imaging methods (CT, FA, ICG, MRI, OCT, RTA, SLO, ultrasound), 604 myopia,

Abstract Body:

Purpose: To compare the diagnostic ability to detect glaucomatous changes between the macular ganglion cell complex (GCC) and peripapillary retinal nerve fiber layer (RNFL) thickness in highly myopic patients using Fourier-Domain optical coherence tomography (OCT).

Methods: Participants, consecutively enrolled from January 2009 to June 2009, underwent Stratus OCT (fast RNFL scan, Carl Zeiss Meditec, Dublin, CA) and RTVue OCT (ONH scan and GCC scan, Optovue Inc, Fremont, CA) during the same visit. Axial length was measured using partial laser interferometry, and noncycloplegic refraction was measured using an autorefractor and then further refined subjectively. The relationship between demographic variables and OCT parameters was evaluated using multiple linear regression analysis in normal controls. Area under the receiver operator characteristic (AUROC) curves were generated to assess the ability of each parameter to detect glaucomatous changes.

Results: Seventy-three normal controls and 77 glaucoma patients were included. Participants were categorized as 105 non-high myopes (Spherical equivalent [SE] >-6.0 diopters) and 45 high myopes (SE ≤ -6.0 diopters). The GCC thickness showed a strong correlation with RNFL thickness using both Stratus and RTVue OCT (correlation coefficient = 0.741 and 0.763, $p < 0.001$ and $p < 0.001$, respectively) in all participants. The axial length showed a significant relationship with average RNFL thickness using both Stratus and RTVue OCT ($p = 0.050$ and 0.040, respectively), but was not associated with the average GCC thickness ($p = 0.836$). Although the difference did not reach statistical significance, the ability to detect glaucomatous changes in the highly myopic group by examining the average GCC thickness (AUROC, GCC; 0.933) was higher than when examining RNFL thickness from either type of OCT (AUROC, Stratus RNFL; 0.857, RTVue RNFL; 0.857).

Conclusions:
The ability to diagnose glaucoma with macular GCC thickness was comparable to that with peripapillary RNFL thickness in high-myopia patients. As macular GCC thickness is less affected by axial length than peripapillary RNFL thickness, macular GCC thickness measurements may be a good alternative or a complimentary measurement to RNFL thickness assessment in the clinical evaluation of glaucoma in patients with high myopia.

Support:	None

Program#/Poster#:	246/A514
Abstract Title:	Reproducibility of Measurement During Middle Days Interval of Macular Retinal Nerve Fiber Layer Thickness Using Spectral-Domain Optical Coherent Tomography (SD-OCT)
Presentation Start/End Time:	Sunday, May 02, 2010, 8:30 AM -10:15 AM
Session Number:	110
Session Title:	Retinal Imaging in Glaucoma 🟡🔵
Location:	Hall B/C
Reviewing Code:	231 glaucoma: imaging – GL

Author Block:	*M. Takamatsu, Y. Kiuchi, T. Sone.* Dept of Ophthalmology and Visual Science, Hiroshima University, Hiroshima, Japan.

Keywords:	549 imaging/image analysis: clinical, 551 imaging methods (CT, FA, ICG, MRI, OCT, RTA, SLO, ultrasound), 530 ganglion cells

Abstract Body:

Purpose: To evaluate the reproducibility of measurement of macular retinal nerve fiber layer thickness over time using spectral domain optical coherence tomography (SD-OCT), we compared earlier and later findings.

Participants: In 24 eyes of fourteen participants, macular retinal nerve fiber thickness was serially measured using RTVue-100[®] (Optovue, Inc., Fremont, CA, USA) with GCC program at Hiroshima University Hospital two or more times at intervals ranging from one month to two years. Patients were excluded if they had a history of episodes of IOP elevation exceeding 3mmHg or 20%, reflection error larger than +3.00D or -6.00D, or other retinochoroidal disease such changeable central macular structure or history of intraocular operations other than cataract surgeries.

Methods: We compared earlier and later findings. The results include measurements of various macular retinal fiber layers such as ganglion cell complex layer thickness (GCCT), outer retinal nerve fiber layer thickness (ORNFLT) and retinal nerve fiber layer thickness (RNFLT) and the reproducibility of those measurements was evaluated.

Results: The average age of participants was 57.8 ± 19.2 yo. and the average MD of eyes was -10.97 ± 10.48dB. The eyes measured had been diagnosed as normal, as having giant disc or glaucoma. At the first measurement ORNFLT (average $164.67\pm16.69\mu m$), RNFLT (average $241.39\pm21.76\mu m$) and GCCT (average $76.71\pm14.90\mu m$). Correlation of earlier and later findings for GCCT at the superior half was $r^2=0.87$ (p<0.0001) and that at the inferior half was $r^2=0.95$ (p<0.0001) and that of the average of the superior and inferior halves was $r^2=0.95$ (p<0.0001). Correlation of earlier and later findings for ORNFLT at the superior half was $r^2=0.38$ (p=0.0014) and that at the inferior half was $r^2=0.44$ (p=0.0008) and that of the average of the superior and inferior halves was $r^2=0.52$ (p=0.0001). Correlation of earlier and later findings for RNFLT at the superior half was $r^2=0.44$ (p=0.0004) and that at the inferior half was $r^2=0.54$ (p<0.0001) and that of the average of the superior and inferior halves was $r^2=0.48$ (p=0.0002).

Conclusion: On serial measurements of macular nerve fiber layer thickness using SD-OCT, the earlier and later findings of the GCC layer and outer part and full retina showed good correlation, indicating good reproducibility.

CommercialRelationships:	**M. Takamatsu**, None; **Y. Kiuchi**, None; **T. Sone**, None.
Support:	None
Clinical Trial:	www.umin.ac.jp/ctr/index/htm UMIN000002841

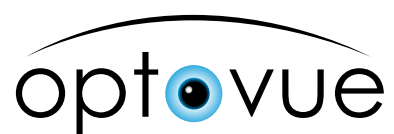|	
Program#/Poster#:	1038/A601
Abstract Title:	Association Between Structural Parameters and Visual Function in Different Stages of Glaucoma
Presentation Start/End Time:	Sunday, May 02, 2010, 2:45 PM - 4:30 PM
Session Number:	150
Session Title:	Novel Imaging Technologies and Functional Imaging
Location:	Hall B/C
Reviewing Code:	311 ocular imaging: structure and function – VI

Author Block: A.L. LoDuca, T.S. Vajaranant, J.T. Wilensky, R. Zelkha, M. Shahidi. Ophthalmology and Visual Sciences, University of Illinois at Chicago, Chicago, IL.

Keywords: 549 imaging/image analysis: clinical, 607 nerve fiber layer, 754 visual fields

Abstract Body: Purpose: To determine the association between visual function, as measured by Humphrey visual field (HVF), and structural parameters of lamina cribrosa (LC), peripapillary retinal nerve fiber layer (pRNFL) and ganglion cell complex (GCC) thickness, as measured by optical coherence tomography (OCT) at different stages of glaucoma.

Methods: Forty one eyes of 24 glaucoma patients were classified as pre-perimetric (glaucomatous optic neuropathy with normal HVF), early with mean deviation (MD) > -6 dB and advanced with MD < -6 dB. The RTVue spectral domain OCT commercial software was used to measure GCC (RNFL + ganglion cell + inner plexiform layers) and pRNFL thickness. LC thickness was measured by 3 masked observers from 3D optic nerve OCT scan images. Significance of differences in structural parameters among groups was established using analysis of variance. Linear regression analysis determined the association between structural parameters and visual function.

Results: LC thickness measurements in pre-perimetric, early, and advanced glaucoma were 262 + 29, 193 + 27 and 107 + 16 microns, respectively. pRNFL thickness measurements in pre-perimetric, early, and advanced glaucoma were 98 + 14, 77 + 11 and 70 + 6 microns, respectively. GCC thickness measurements in pre-perimetric, early and advanced glaucoma were 90 + 10, 73 + 9 and 71 + 8 microns, respectively. There was a statistically significant difference in LC, pRNFL and GCC thickness among patients with pre-perimetric (MD = 0.66 + 0.8 dB; N=13), early (MD = -2.9 + 1.6 dB; N=14) and advanced (MD = -12.1 + 7.0 dB; N=14) glaucoma ($p < 0.001$). In the pre-perimetric group, pRNFL and GCC thickness significantly correlated with MD (r=0.75, p=0.003 and r=0.84, p=0.0003, respectively). In the early group, LC and pRNFL thickness significantly correlated with MD (r=0.86, p<0.001 and r=0.75, p=0.002, respectively). In the advanced group, only LC thickness significantly correlated with MD (r=0.67, p=0.008).

Conclusions: An overall association between visual function and structural parameters of LC, pRNFL, and GCC thickness was found. The results suggest that LC thickness may be a better parameter for monitoring patients with advanced stage glaucoma.

CommercialRelationships: A.L. LoDuca, None; T.S. Vajaranant, None; J.T. Wilensky, None; R. Zelkha, None; M. Shahidi, None.